FACT SHEET

ORDER NO. R2-2003-0045
NPDES PERMIT NO. CA0038024

AMENDMENT OF WASTE DISCHARGE REQUIREMENTS, ORDER NO. R2-2003-0072, FOR:

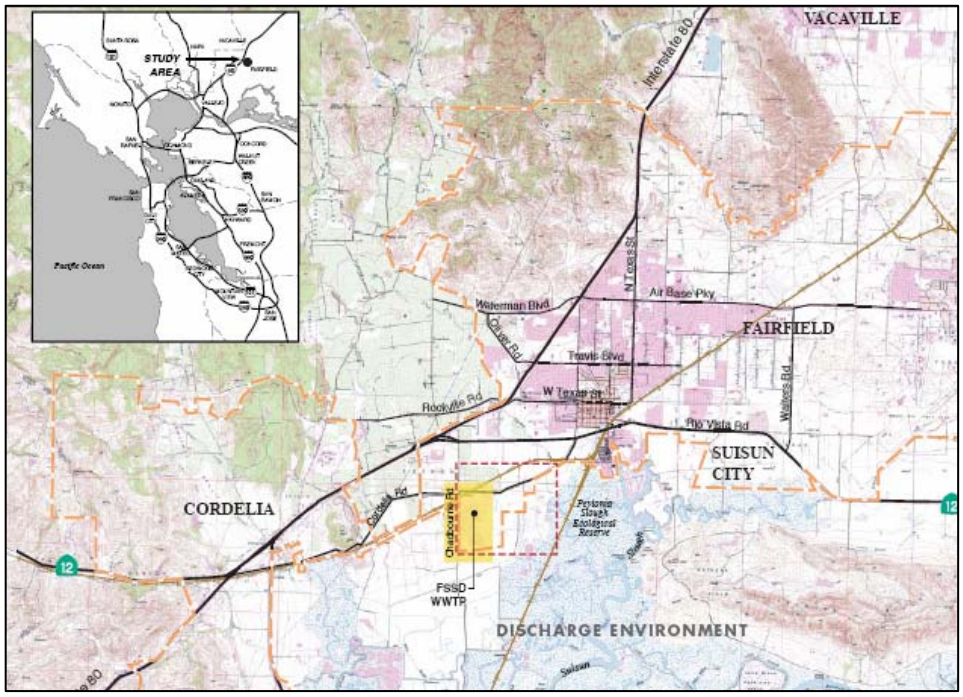
FAIRFIELD-SUISUN SEWER DISTRICT
FAIRFIELD, SOLANO COUNTY

The Fairfield-Suisun Sewer District (hereinafter the "Discharger") applied to the Water Board for an amendment of its NPDES permit, Order No. R2-2003-0072, for discharge of pollutants into waters of the State and the United States. The Discharger requested changes in the facility description, permitted capacity, and discharge location. The amended order allows an increase in the discharge of treated wastewater effluent to Boynton Slough, which is part of Suisun Marsh, and also allows the discharge of treated wastewater effluent to Ledgewood Creek, which is a tributary to Suisun Slough, which in turn is a part of Suisun Marsh.

Facility Description

The Discharger owns the Fairfield-Suisun Wastewater Treatment Plant (hereinafter the "Plant"), located at 1010 Chadbourne Road, Fairfield, Solano County, California (see Figure 1). The Plant provides tertiary treatment of wastewater from domestic,

FIGURE 1: Plant Location



Source: ESA/FSSD

commercial, and industrial sources within the City of Fairfield, City of Suisun City, and, by contract, some unincorporated properties in Solano County. The Discharger's service area has a population of approximately 130,000.

The U.S. Environmental Protection Agency and the Water Board have classified this discharge as a major discharge. During the period 2000-2002, the Plant's average dry weather flows (ADWFs) ranged from 13.2 to 14.8 million gallons per day (mgd) (determined based on three consecutive dry weather months of each year). These flows are as high as about 85% of the Plant's design capacity (17.5 mgd).

Approximately 10% of the Plant's treated effluent is recycled for agricultural irrigation, landscape irrigation, and industrial cooling through the recycling outfall (E-004), which discharges into irrigation water conveyance and distribution facilities owned and operated by the Solano Irrigation District and the Discharger. The discharges of reclaimed water to land are regulated by a separate Order, Water Reclamation Requirements Order No. 91-147, adopted by the Water Board on October 16, 1991. Treated effluent is also discharged intermittently from turnouts located on the Boynton Slough outfall pipeline to privately owned and managed duck ponds in Suisun Marsh. The Solano Irrigation District and the Department of Fish and Game determine the frequency and volume of these discharges (primarily based on seasonal rainfall). Discharges to the duck ponds from the Plant are regulated by the existing permit (Order No. R2-2003-0072).

Future Treatment Plant and New Outfall Description

In 2001, the Discharger completed a Sewer System and Treatment Plant Master Plan update. The Master Plan update concluded that a treatment plant expansion is needed to accommodate future growth within the Discharger's service area. The Discharger has completed additional engineering analyses and an Environmental Impact Report for facility construction to increase full treatment capacity to 23.7 mgd ADWF. These studies also address construction of a new outfall to Ledgewood Creek to provide for maintenance of the existing Boynton Slough outfall, seismic redundancy, and increased wet weather capacity to accommodate future flows. The construction of the additional treatment facilities and outfall are to be completed in approximately 2008.

The existing and proposed discharge locations are as follows:

Discharge Point Name	***Code***	***Latitude***	***Longitude***
Boynton Slough Outfall	E-001	38 deg 12 min 33 sec	122 deg 3 min 24 sec
Duck Club Turnout No. 1	E-002	38 deg 12 min 52 sec	122 deg 3 min 56 sec
Duck Club Turnout No. 2	E-003	38 deg 12 min 35 sec	122 deg 3 min 29 sec
Irrigation Reuse Outfall	E-004	38 deg 13 min 23 sec	122 deg 5 min 00 sec
Ledgewood Creek Outfall *(proposed)*	E-005	38 deg 14 min 6 sec	122 deg 3 min 31 sec

After completion of construction and startup of the new Ledgewood Creek Outfall (E-005), the operation of the two outfalls will be as follows:

(a) During normal dry weather conditions, the Boynton Slough outfall will be the primary outfall in conformance with past practice;

(b) During wet weather conditions, flows exceeding the capacity of the Boynton Slough outfall (approximately 35 mgd) will be discharged through the Ledgewood Creek outfall;

(c) During maintenance or other periods of shutdown of the Boynton Slough outfall, flows will be discharged through the Ledgewood Creek outfall.

Beneficial Uses of Receiving Waters

Beneficial uses have not been specifically designated in the Basin Plan for Boynton Slough and Ledgewood Creek. Various sloughs in the watershed, including Boynton Slough, Ledgewood Creek, and Suisun Slough, support the beneficial uses of Suisun Marsh. Suisun Marsh is designated in the Basin Plan as supporting estuarine habitat. Based on the results of the Boynton Slough Beneficial Use Classification study (2002), brackish marsh plants are found throughout the tributary waters to Suisun Marsh. Based on this, and through consideration of the tributary rule described in the Basin Plan, Boynton Slough has previously been deemed to support the estuarine habitat beneficial use.

As shown in Figure 2, Ledgewood Creek is located in the vicinity of Boynton Slough; based on information provided in the Environmental Impact Report, vegetation in Ledgewood Creek is similar to that existing in Boynton Slough and other tributaries to Suisun Marsh. As such, Ledgewood Creek is deemed to support estuarine habitat.

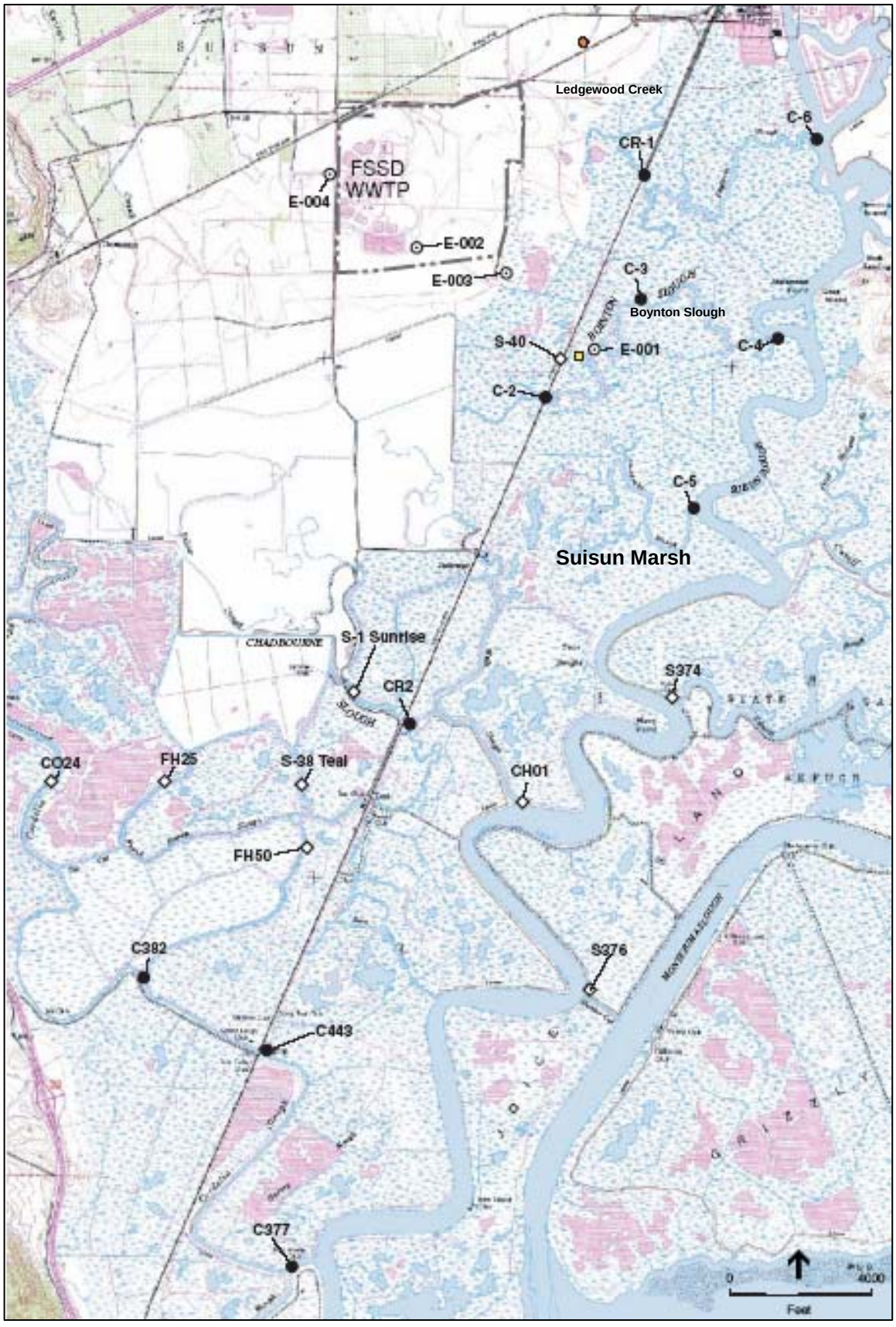
Reasonable Potential Analysis

USEPA regulations (40 CFR 122.44(d)(1)(i)) require that water quality-based effluent limitations be established for constituents that cause or have a reasonable potential to cause or contribute to violations of a water quality objective. The State Implementation Policy (SIP) describes how this determination must be made for priority pollutants for which water quality standards have been adopted in the California Toxics Rule. A reasonable potential analysis is therefore needed for the proposed new discharge to Ledgewood Creek. The analysis of reasonable potential for this discharge described here is patterned after the reasonable potential analysis performed for Order No. R2-2003-0072, the current permit for discharge to Boynton Slough.

Boynton Slough Discharge

The constituents determined to have reasonable potential for the Boynton Slough discharge are shown in Table 1 of Order No. R2-2003-0072 and summarized below:

FIGURE 2: Ledgewood Creek, Boynton Slough, and Suisun Marsh



Source: ESA, FSSD

Constituent with Reasonable Potential	***Basis for Reasonable Potential Determination***
Cadmium	Maximum Effluent Concentration (MEC) exceeds Basin Plan freshwater objective
Chromium VI	Maximum ambient background concentration exceeds Basin Plan freshwater objective
Copper	MEC and maximum ambient concentration exceeds California Toxics Rule (CTR) saltwater objective
Mercury	Maximum ambient background concentration exceeds Basin Plan freshwater objective
Nickel	Maximum ambient background concentration exceeds Basin Plan saltwater objective
Cyanide	MEC exceeds CTR saltwater objective
TCDD TEQ	Basin Plan narrative and best professional judgment
Dichlorobromomethane	MEC exceeds CTR human health objective
Bis (2-ethylhexyl) phthalate	MEC exceeds CTR human health objective
4,4'-DDE	Maximum ambient background concentration exceeds CTR human health objective
Dieldrin	Maximum ambient background concentration exceeds CTR human health objective

The above reasonable potential determinations were based on several factors: (1) maximum effluent concentrations determined from effluent data collected between January 2000 through December 2002 for trace metals and toxic inorganics and data collected between April 1998 through December 2002 for toxic organics; (2) maximum ambient concentrations detected at the RMP Sacramento River station between 1993 and 2000 and additional data collected under the Section 13267 sampling mandated by the letter dated August 6, 2001; (3) and water quality objectives in the Basin Plan and CTR at the time of adoption of Order No. R2-2003-0072. The applicable water quality objectives were determined based on ambient salinity and hardness concentrations in the vicinity of the Boynton Slough discharge location.

The reasonable potential analysis accounts for the salinity of the receiving waters. The CTR specifies that the lower of freshwater or saltwater water quality objectives (WQOs) apply unless salinity is either less than 1 ppt or greater than 10 ppt more than 95% of the time. Ambient salinity data gathered at eight stations in Boynton Slough and adjacent sloughs in the vicinity of the current discharge for the period 1998 through 2002 were used in the preparation of Order No. R2-2003-0072. Those data indicate a salinity range from 0.0 to 12.2 parts per thousand (ppt), with 33% of the data less than 1 ppt and less than 1% of the data greater than 10 ppt. Therefore, the lower of the saltwater and freshwater objectives were used in the reasonable potential analysis for the Boynton Slough discharge.

The reasonable potential analysis also accounts for the hardness of the receiving waters. Ambient hardness values were used to calculate freshwater WQOs for trace metals that

are hardness dependent. For the Boynton Slough discharge, an adjusted geometric mean hardness value of 268 mg/l as $CaCO_3$ was used to calculate hardness dependent freshwater WQOs. This value was calculated from a censored data set that included only those hardness values that were (a) less than 400 mg/l as $CaCO_3$ and (b) associated with salinity values less than 1.0 ppt. The adjusted geometric mean is defined as a value below which lie 30% of the data.

Ledgewood Creek Discharge

The reasonable potential analysis for the proposed Ledgewood Creek discharge is based on the following:

- Effluent quality discharged to Ledgewood Creek will be identical to the effluent quality used as the basis for Order No. R2-2003-0072. Therefore, those elements of the SIP methodology based on effluent quality lead to reasonable potential results for the Ledgewood Creek discharge similar to those determined in Order No. R2-2003-0072 for the Boynton Slough discharge.

- Salinity and hardness conditions in Ledgewood Creek are similar to the conditions that occur in Boynton Slough and adjacent sloughs. The table below shows a summary of salinity and hardness data measured in Ledgewood Creek (Station CR-1) during the period of August 2000 through May 2001.

Sample Date	***Salinity (ppt)***	***Hardness as $CaCO_3$ (mg/l)***
August 9, 2000	2.9	780
October 18, 2000	3.7	700
December 6, 2000	1.7	410
March 7, 2001	0.8	300
May 3, 2001	1.0	380

Based on the above data, and consistent with the determination made for the Boynton Slough discharge, the lower of freshwater or saltwater criteria are applicable to the Ledgewood Creek discharge. Also, based on the above data, the hardness in Ledgewood Creek is equal or greater than the 268 mg/l value used to establish freshwater objectives in the reasonable potential analysis for Boynton Slough. As a conservative assumption, the same freshwater objectives can be used in the Ledgewood Creek reasonable potential analysis and effluent limit derivation.

Since the ambient data for Boynton Slough and Ledgewood Creek are the same, those elements of the SIP methodology based on compliance with receiving water quality objectives lead to the same reasonable potential for the Ledgewood Creek discharge as were determined in Order No. R2-2003-0072 for the Boynton Slough discharge. Therefore the effluent limitations stated in Table 4 of the original permit can apply to the Ledgewood Creek discharge.

Antidegradation Analysis

The Discharger prepared an antidegradation analysis in accordance with State Water Resourced Control Board Administrative Procedures Update 90-04. Based on the study, an increase in the effluent discharge flow rate to 23.7 mgd (ADWF) to accommodate planned growth in the service area and the new discharge to Ledgewood Creek is consistent with federal and state antidegradation policy requirements.

The analysis evaluated the water quality changes associated with the flow increase and new discharge location in Ledgewood Creek. The study considered the increased magnitude of mass loads for specific constituents compared to other San Francisco Bay loads and changes in ambient water quality. The study concluded that the changes will not measurably affect water quality in any portion of Suisun Slough, Grizzly Bay, Suisun Bay, or other San Francisco Bay segments. When compared to other known sources of various pollutants to San Francisco Bay, the incremental increases due to the proposed changes amount to less than 0.5% for all constituents. The results vary by constituent, and in most cases, the incremental increases are less than 0.05%. Mercury is a special concern because, with or without the proposed changes, mercury concentrations sometimes exceed the existing water quality objective (a proposal to change the objective is underway). The incremental mercury load increase would be about 0.003% of the total San Francisco Bay mercury load. Consistent with the proposed San Francisco Bay mercury TMDL, however, the Discharger would not receive an additional wasteload allocation to accommodate this incremental increase and may need to offset it by enhancing mercury control programs (see "Benefits of Source Control Programs," below). The incremental increase in mercury loads may be offset by a reduction in methylmercury production (see "Benefits Related to Mercury Bioaccumulation," below).

Net Environmental Benefit

Historic Context

In 1985, as part of NPDES permit reissuance Order No. 85-53, the Water Board granted the Discharger a provisional exception to the Basin Plan prohibition on discharge (1) to waters in which the discharge does not receive an initial dilution of at least 10:1 or (2) to a dead-end slough, similar confined waters, or any immediate tributaries thereof. The exception was based on the provision that the discharge affords a net environmental benefit and the Discharger complies with the requirements of it permit. Order No. 85-53 required maximizing reclaimed water use for irrigation, preparing emergency wastewater storage, completing technical reports on maximizing reclaimed water use and discharge impacts on beneficial uses, and implementing report recommendations.

In 1990, in adopting NPDES permit reissuance Order No. 90-101, the Water Board found that the Discharger complied with the requirements of Order No. 85-53. In addition to taking steps to increase the percentage of effluent discharged for reclamation through the Solano Irrigation District distribution system and construction of flow equalization and storage facilities, the Discharger completed the required technical report about the effects

of the discharge on water quality and beneficial uses (Technical Report on Water Quality, Fairfield-Suisun Sewer District Subregional Wastewater Treatment Plant, September 1987). The report evaluated discharge impacts on Boynton Slough and demonstrated that the discharge affords a net environmental benefit to Boynton Slough and Suisun Marsh.

In 1992, the Discharger completed construction of additional facilities to increase storage capacity for peak wet weather flows and to provide improved flexibility and redundancy for the tertiary treatment plant. The approach to wet weather flow management was in accord with the Basin Plan's wet weather overflow control strategy.

In issuing the existing NPDES permit (Order No. R2-2003-0072) in 2003, the Water Board again found environmental benefit and authorized the discharge of treated effluent to Boynton Slough and the managed duck ponds of Suisun Marsh, provided that the Discharger continues to do the following:

a. Provide high quality treated effluent;

b. Operate all treatment facilities to assure high reliability and redundancy;

c. Implement a source control program for any regulated constituents measured at levels in violation of effluent limitations;

d. Implement measures to maintain, repair, and upgrade existing wastewater facilities to ensure continued operation and treatment capability in conformance with permit requirements;

e. Make progress toward construction of expanded or upgraded treatment facilities;

f. Promote and encourage beneficial reuse of treated wastewater (e.g., discharge of treated effluent to the managed duck ponds of Suisun Marsh); and

g. Maximize use of reclaimed effluent for irrigation and minimize discharges to Boynton Slough during dry weather.

Benefits of Ledgewood Creek Discharge

The rationale for concluding that Boynton Slough discharges provide environmental benefits also applies to Ledgewood Creek discharges. The Discharger continues to provide high quality treated effluent; operate reliable and redundant treatment facilities; implement source control (see "Benefit of Source Control Programs," below); maintain, repair, and upgrade existing wastewater facilities to ensure permit compliance; make progress toward construction of expanded or upgraded treatment facilities; promote and encourage beneficial reuse of treated wastewater; and maximize use of reclaimed effluent.

Benefits Related to Mercury Bioaccumulation

The Discharger performed a study in 2000 and 2001 to evaluate the impact of its treated effluent discharge on the mercury methylation rate in Suisun Marsh. The Discharger collected receiving water data and effluent data during five sampling events over ten months. The samples were analyzed for total and dissolved mercury and total and dissolved methyl mercury and other water quality constituents. The study showed two significant trends. First, the treated effluent tended to reduce methylation rates in the vicinity of the discharge in Suisun Marsh. Second, the total mercury concentrations in the treated effluent were four-fold lower than concentrations observed in the receiving water. These results demonstrated that, for mercury, the discharge provides a net environmental benefit by reducing bioavailable methyl mercury concentrations and by diluting mercury concentrations in Suisun Marsh.

Benefit of Source Control Programs

The Discharger has developed and implemented source control programs to encourage pollution prevention and waste minimization as one means of addressing constituents of concern within its service area. These programs have been implemented in concert with the direction provided by the Water Board in the Basin Plan.

The Discharger implements mercury source control programs, focusing on dental and household hazardous waste sources. The Discharger has identified local dental facilities and worked with them to gain voluntary reductions in mercury discharges associated with dental amalgam. The Discharger's outreach encourages proper management of dental wastes containing mercury. The discharger also supports and participates in household hazardous waste collection programs implemented by the cities of Fairfield and Suisun City. Key mercury related elements of these programs are the collection of mercury containing electrical switches, fluorescent lights, thermometers, dry cell batteries, and other mercury containing wastes.

The also Discharger implements a copper source reduction program. In addition to supporting the ban on copper containing root control agents, the Discharger has worked closely with local water purveyors to reduce the corrosivity of potable water supplies and has instituted an industrial and commercial inspection program to control the discharge of copper and other pollutants to the sanitary sewer and the storm drain system.

Collection System Capacity

Collection system infrastructure (e.g., sewer mains and pump stations) must be appropriately sized to handle proposed flow increases. Otherwise, increased flows could result in sewer overflows. Sewer system overflows are not anticipated to increase due to the increase in discharge allowed by this permit. The Discharger has developed a master plan for its collection system and has an ongoing preventive maintenance and capital improvement program for the collection system components to ensure adequate reliability and capacity.

The Discharger's wastewater collection system includes 70 miles of trunk sewer lines (lines 12 inches in diameter and larger) and 11 pump stations. Eight of the pump stations have emergency power systems. Of the remaining three pump stations, one has an auxiliary gravity flow line and the others have sufficient sewer line surcharge capacity and remote alarm systems to allow for mobilization of portable electrical generation equipment. The Discharger has ongoing preventive maintenance and capital improvement programs for the sewer lines (both gravity and force mains) and the pump stations to ensure adequate collection system reliability and capacity. Sewers less than 12 inches in diameter are owned and maintained by separate jurisdictions from the Discharger, namely the City of Fairfield, the City of Suisun City, and Travis Air Force Base. Each of these "satellite" collection system agencies is independently responsible for an ongoing program of maintenance and capital improvements for sewer lines and pump stations within their respective jurisdictions to ensure adequate capacity and reliability of the collection system.

The Discharger's Sewer System and Treatment Plant Master Plan update addresses the need for the collection system to accommodate future growth within the Discharger's service area. Existing and planned facilities and programs will effectively minimize infiltration and inflow. The Discharger will use capacity analysis and planning to implement capital improvements in advance of demand.

Rationale for Changes in Provisions and Monitoring Requirements

In addition to amending a number of the findings of Order No. R2-2003-0072, this order amends three specific requirements, listed as items 14, 15, and 16 of the order. The rationales for these changes are described below.

15. Replace Footnote 4 of Table 1

This change adds references to cadmium, lead, and silver to Footnote 4 to correct a clerical error in the existing permit. This change does not directly relate to the increased flow or new discharge location.

16. Replace Discharge Prohibition A.4

This change allows the flow to increase from 17.5 mgd to 23.7 mgd (average dry weather flow) and authorizes the new Ledgewood Creek outfall. The increase is consistent with state and federal antidegradation policies (see "Antidegradation Analysis," above). The amended text specifies three conditions to be met prior to increasing the flow or using the new outfall. An engineering analysis must be submitted to the Executive Officer that demonstrates that the treatment facilities and outfall are designed to provide sufficient capacity for the increased flows. Certification is required to demonstrate that the treatment facilities and outfall are constructed as designed. The operations and maintenance manual and contingency plan must be updated to address the new facilities.

These requirements will ensure that the plant is designed and constructed in a manner consistent with the permit so as to ensure the protection of water quality.

This change also defines how the average dry weather flow is to be calculated.

17. Replace the first paragraph under "B. Effluent Limitations"

This change adds a new monitoring station for Ledgewood Creek and specifies that the existing effluent limitations that apply to Boynton Slough discharges also apply to Ledgewood Creek discharges. The quality of the Ledgewood Creek discharges is to be the same as the quality of the Boynton Slough discharges. Therefore, compliance with many of the effluent limitations can be monitored at existing station E-001-D. However, a new monitoring station, E-005-S, is to be used to monitor compliance with effluent limitations specified in Sections B.1(g), B.2, B.5, and B.6 of Order No. R2-2003-0072. Such monitoring will reflect conditions specific to the Ledgewood Creek discharge.

18. Add Station E-005-S to Self Monitoring Program Part B

These changes add monitoring station E-005-S to the Self Monitoring Program and specify the schedule of sampling and analysis for station E-005-S. Monitoring at E-005-S is to occur on the same schedule and involve the same analyses as the equivalent monitoring at E-001-S.

Notification of Interested Parties

The Water Board encourages public participation in the amendment process. It notified the Discharger and interested agencies and persons of its intent to amend Order No. R2-2003-0072, and has provided them with an opportunity to submit their written comments and recommendations. Paper and electronic copies of this Order were provided to the Discharger, and the Vallejo Times-Herald published a notice that this item would appear before the Water Board on July12, 2006.